

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 92-017

WASTE DISCHARGE REQUIREMENTS FOR REVISION AND REISSUANCE OF NPDES
NO. CA0028649:

INTEL CORPORATION
JULIETTE LANE FACILITY
SANTA CLARA
SANTA CLARA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter called the Board) finds that:

1. Intel Corporation, hereinafter called the discharger, by application received April 2, 1991, has applied for the re-issuance of its permit to discharge to surface waters under the National Pollutant Discharge Elimination System (NPDES).
2. The discharger owns and operates a semiconductor and integrated circuit research and manufacturing facility located on an approximately 20 acre parcel at 3601 Juliette Lane in the City of Santa Clara, Santa Clara County. This location is about 1/4 mile north by northeast of the intersection of Route 101 and Montague Expressway (see Figure 1).
3. Intel has been discharging, on the average, 1650 gallons per day of two waste streams in compliance with NPDES Permit No. CA0028649. Discharge has been to a storm drain tributary to San Tomas Aquino Creek, the Guadalupe Slough, and South San Francisco Bay. This permit was amended in 1988 to include the discharge of treated groundwater from a groundwater remediation system and to delete the discharge of reject water from an onsite, reverse osmosis treatment system. This permit and its amendments expired on August 20, 1991. This discharge has been allowed to continue, with the approval of the Executive Officer, under the conditions of Board Order 86-061 as amended by Order No. 88-056.
4. The proposed discharge consists of the two waste streams as permitted in the amended permit issued in 1988. Waste 001 (see Figure 2) consists of less than 2,500 gallons per day (gpd) treated of groundwater. This groundwater is produced from a single groundwater extraction well. Treatment is by a carbon adsorption system to remove petroleum hydrocarbons and volatile organics prior to discharge. Discharge of waste 001 has been through a connection to the City of Santa Clara storm Drain system located in the facility maintenance yard.

Waste 002 (see Figure 3) has been deleted from the reissuance

of this permit. Staff review of this discharge indicates that it should contain no deleterious substance and is therefore not appropriate for regulation under an NPDES permit. Discharge may continue and will eventually be regulated under the non-point source program.

5. An underground fuel tank and surrounding contaminated soils were excavated and removed following a diesel spill in January 1985. As part of a groundwater monitoring program related to the tank removal and underground storage tank monitoring requirements diesel fuel and chlorinated solvents, including 1,1,1-trichloroethane (1,1,1-TCA), trichloroethylene (TCE), 1,2-dichloroethane (1,2-DCA), and 1,2-dichloroethylene (1,2-DCE), were also detected in groundwater beneath the facility.
6. An extraction well and treatment system were installed to cleanup and prevent the further migration of groundwater pollutants. Groundwater extraction as an interim remedial action has been continuous since 1985. The soil removal and groundwater extraction has resulted in the reduction in groundwater monitor wells of the diesel fuel components to non-detectable levels. However, 1,1,1-TCA, 1,1-dichloroethane (1,1-DCA), 1,2-DCE, and 1,1-dichloroethylene (1,1-DCE), are currently detected in the groundwater. TCA has historically been the volatile organic chemical most commonly detected in groundwater at this site. Since 1985 the detection of 1,2-DCA and 1,2-DCE has become increasingly infrequent and the occurrence of 1,1-DCE and 1,1-DCA has increased in frequency. The highest levels of groundwater contamination for the October 1991 sampling event generally occurred in well IFI-9. Groundwater from this well contained 28 ppb TCA, 17 ppb 1,1-DCA, and 29 ppb 1,1-DCE.

The highest overall level of groundwater pollution is detected at the influent to the groundwater treatment system, from groundwater extraction well R-2. The concentrations recorded at this sampling point in October 1991 included, 1,1,1-TCA at 340 ppb, 1,1-DCA at 210 ppb, 1,1-DCE at 23 ppb, and total petroleum hydrocarbon (TPH) at 400 ppb.

7. The chemicals of concern for waste stream 001 are anticipated to be 1,1,1-TCA, 1,1-DCA, 1,2-DCE, 1,1-DCE, petroleum hydrocarbons, and possibly 1,2-DCA. The chemicals of concern from waste stream 001 have typically not been detected in the effluent from the carbon adsorption system.
8. This order updates and re-issues NPDES Permit No. CA0028649 originally issued on August 20, 1986 and amended April 20, 1988 by Board Orders 86-061 and 88-056, respectively. In updating and re-issuing the Permit, modifications have been made based on the amendments to the Water Quality Control Plan for the San Francisco Bay Region (Basin Plan), adopted by the Regional Board on December 11, 1991. These modifications are:
 - a. All effluent limitations have been changed from quarterly

median/daily maximum limits to instantaneous maximum limits for discharge to freshwater.

- b. Inorganic effluent limitations and a requirement to determine back ground concentrations of inorganics in groundwater has been added to the Permit.
9. Typically, regulation of pollutants in NPDES permits for discharge of treated groundwater to surface waters has focused on substances present in the groundwater due to the contamination incident(s) subject to cleanup. However, available data indicate that concentrations of inorganics in treated groundwater often exceed the shallow water effluent limitations. In many cases, the presence of inorganics in groundwater is due to natural factors related to soil and water chemistry, rather than contamination. The need to minimize the potential for aquatic toxicity due to elevated levels of inorganics must be balanced against the total mass loading from these discharges, the cost of treatment, and naturally occurring discharge of groundwater with equally high concentrations of inorganics.
 10. Due to considerations in Finding Number 9, above, the Inland Surface Waters and Enclosed Bays and Estuaries Plans allow for short-term variances from Basin Plan provisions, if necessary, for discharges resulting from control measures to protect drinking water supplies and where natural background concentrations are typically greater than shallow water effluent limits. The variances will take the form of alternate effluent limitations. Therefore, the discharger will be required to determine background groundwater inorganics concentrations in the vicinity of the Intel site. Based on the results of that study, the discharger will be required to meet the effluent limitations in Table 1 by March 31, 1993, or if the natural background concentrations are greater than the shallow water freshwater effluent limits, the Regional Board may consider granting a short-term variance to the discharger, and alternate limits will be developed.
 11. The discharger, as part of the permit application package, has evaluated the three potential discharge options: 1) reuse, 2) discharge to the POTW, and 3) continued discharge regulated by NPDES permit.

Offsite reuse is limited by the lack of a distribution network to move the water from the site. Truck access is limited by the physical size of the site and site security. The small volume of water available further limits the economic feasibility of offsite reuse of the water.

No significant amount of landscaping exists nearby the treatment system. Therefore potential for cost effective irrigation use is limited. Use of the treated water in the site cooling towers is still being evaluated, though recent discussions with the discharger indicate that reuse of the

large volumes of water produced by the reverse osmosis treatment are of a higher priority and it is unlikely that reuse of the groundwater will be possible in the near future.

Discharge to the POTW is not currently legal or feasible. The city of Santa Clara Sewer Ordinance Section 23-4.1, prohibits the acceptance of groundwater into the sanitary sewer system.

Based on this review the discharger has proposed that the most cost effective solution is to continue discharge of the treated groundwater to surface waters. In the interest of efficiency and groundwater conservation, groundwater extraction has been reduced to the minimum that will provide containment of the contaminant plume.

12. The Regional Board adopted a revised Water Quality Control Plan for the San Francisco Bay Region (Basin Plan) on December 17, 1986. The Basin Plan contains water quality objectives for South San Francisco Bay, and contiguous surface and groundwater.
13. The existing and potential beneficial uses of the surface water adjacent to and contiguous with San Tomas Aquino Creek, Guadalupe Slough and South San Francisco Bay include:
 - a. Contact and non-contact water recreation
 - b. Wildlife habitat
 - c. Preservation of rare and endangered species
 - d. Estuarine habitat
 - e. Fish spawning and migration
 - f. Industrial service supply
 - g. Shellfishing
 - h. Navigation
 - i. Ocean commercial and sport fishing
14. The Basin Plan prohibits discharge of wastewater which has "particular characteristics of concern to beneficial uses" (a) "at any point in San Francisco Bay south of the Dumbarton Bridge" and (b) "at any point where the wastewater does not receive a minimum initial dilution of at least 10:1 or into any nontidal water, deadend slough, similar confined water, or any immediate tributary thereof."
15. The Water Quality Control Plan for the San Francisco Bay Region (Basin Plan), adopted by the Regional Board on December 11, 1991, the Inland Surface Waters and Enclosed Bays and Estuaries Plans provide a waiver to the prohibitions referred to in Finding 14 above, when it is part of a groundwater cleanup project, is in accordance with Resolution 88-160, and certification of adequacy and reliability of treatment is provided along with an acceptable operation and maintenance plan.

16. Exceptions to the prohibitions referred to in Finding 14 are warranted for this discharge because the discharge is an integral part of a program to cleanup polluted groundwater, as discussed in Finding 11, is in accord with Resolution 88-160, and has operated without violating the existing effluent limits for over five years. Discharge of waste is a privilege, not a right. Authorization to discharge is conditional upon the discharge complying with provisions of Division 7 of the California Water Code and any more stringent effluent limitations necessary to implement water quality control plans, to protect beneficial uses, and to prevent nuisance. Compliance with this Order should assure this and limit any potential adverse changes in water quality due to the discharge. Should studies indicate chronic effects, not currently anticipated, the Board will review the requirements of this Order based upon section B.1.e.
17. The basin Plan prohibits discharge of "all conservative toxic and deleterious substances, above those levels which can be achieved by a program acceptable to the Board, to waters of the Basin." The discharger's groundwater extraction and treatment system and associated operation, maintenance, and monitoring plan constitutes an acceptable control program for minimizing the discharge of toxicants to waters of the State.
18. Effluent limitations of this Order (as shown in Tables 1 & 2 below) are based on the Basin Plan, State and U.S. Environmental Protection Agency (EPA) plans and policies, best available treatment economically available (BATEA), and best technical judgement. Also considered in the determination of effluent limits were the EPA Region IX draft guidance "NPDES Permit Limitations for Discharge of Contaminated Groundwater: Guidance Document", and the San Francisco Bay Regional Water Quality Control Board Internal Memorandum dated February 16, 1990, "Proposed NPDES Permit Limits For Common Organic Pollutants Found at Service Stations and Other Groundwater Cleanup Sites."
19. The issuance of waste discharge requirements for the discharge is exempt from the provisions of Chapter 3 (commencing with Section 21100) of Division 13 of the Public Resources Code (CEQA) pursuant to Section 13389 of the California Water Code.
20. The Board has notified the dischargers and interested agencies and persons of its intent, under the provisions of Division 7 of the California Water Code Section, to prescribe Waste Discharge Requirements for the discharge and has provided them with the opportunity for a public hearing and an opportunity to submit their written views and recommendations.
21. This action is an order to enforce the laws and regulations administered by the Regional Board. This action is categorically exempt from the provisions of CEQA pursuant to Section 15321 of the Resources Agency Guidelines.

22. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that the discharger, its agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, and the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, shall comply with the following:

A. EFFLUENT LIMITATIONS

1. The discharge of waste 001 containing constituents in excess of the following limits is prohibited:

TABLE 1

Constituent	Instantaneous Maximum Limit ($\mu\text{g/l}$)
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VOC's

1,1,1-Trichloroethane	5.0
Tetrachloroethylene	5.0
Trichloroethylene	5.0
1,1 Dichloroethylene	5.0
1,2-Dichloroethane	0.5
Vinyl Chloride	0.5
cis-1,2-Dichloroethylene	5.0
trans-1,2-Dichloroethylene	5.0
Total VOCs	5.0 ¹

AROMATICS

Benzene	1.0
Ethylbenzene	5.0
Dichlorobenzene	5.0
Trichlorobenzene	5.0
Xylenes	5.0
Total Petroleum Hydrocarbons	50.0 ²

INORGANICS

Shallow Water Effluent Limits

arsenic	190.0
cadmium	1.1
chromium (VI)	11.0
copper	11.8
cyanide	5.2
lead	3.2

¹ Total of 601 analytes

² As Gasoline & Diesel

mercury	2.4
nickel	160.0
selenium	5.0
silver	4.0
zinc	110.0

2. The Ph of the discharge of waste 001 and 002 shall not exceed 8.5 nor be less than 6.5.
3. Toxicity: In any representative set of samples, the discharges shall meet the following limit of quality:

The survival of test fishes in 96-hour static bioassays of the undiluted effluent as discharged shall be a three sample moving median of 90% survival, and a 90 percentile value of not less than 70% survival in a single sample. The bioassays shall be performed according to protocols approved by the U.S. E.P.A. or State Board or published by the American Society for Testing and Materials or American Public Health Association. Two fish species will be tested concurrently. These shall be the most sensitive two species determined from a single concurrent screening of three species using two of the following three test fish species in parallel tests. The test fish shall be rainbow trout, fathead minnow, or three-spine stickleback.

B. RECEIVING WATER LIMITATIONS

1. The discharge of waste shall not cause the following conditions to exist in waters of the State at any place:
 - a. Floating, suspended, or deposited macroscopic particulate matter or foam;
 - b. Bottom deposits or aquatic growths;
 - c. Alteration of temperature, turbidity, or apparent color beyond present natural background levels;
 - d. Visible, floating, suspended, or deposited oil or other products of petroleum origin;
 - e. Toxic or other deleterious substances to be present in concentrations or quantities which will cause deleterious effects on aquatic biota, wildlife, or waterfowl, or which render any of these unfit for human consumption either at levels created in the receiving waters or as a result of

biological concentration.

2. The discharge of waste shall not cause the following limits to be exceeded in waters of the State in any place within one foot of the water surface:

- a. Dissolved oxygen :
5.0 mg/l minimum. The median dissolved oxygen concentration for any three consecutive months shall not be less than 80% of the dissolved oxygen content at saturation.

- b. pH:
The pH shall not be depressed below 6.5 nor raised above 8.5, nor caused to vary from normal ambient pH levels by more than 0.5 units.

- c. U n - i o n i z e d a m m o n i a :
0.025 mg/l Annual Median (as N) 0.400 mg/l Maximum

3. This discharge shall not cause a violation of any applicable water quality standard for receiving waters adopted by the Board or the State Water Resources Control Board as required by the Federal Water Pollution Control Act and regulations adopted thereunder. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Federal Water Pollution Control Act or amendments thereto, the Board will revise and modify this Order in accordance with such more stringent standards.

C. PROVISIONS

1. The Discharger shall comply with all sections of this order immediately upon adoption.

a. TASK: PROPOSALS FOR THE DETERMINATION OF BACKGROUND INORGANIC CONCENTRATIONS

Submit a technical report acceptable to the Executive Officer which contains a proposal to determine the level of naturally occurring inorganics in the groundwater at the site. This study shall include, but need not be limited to, the sampling and analysis in this Self-Monitoring Plan, the location(s) of background groundwater samples to be obtained (sampling to be concurrent with the Self-Monitoring Plan), specification of the analytical methods for inorganic and the expected laboratory detection limits and QA/QC procedures.

COMPLETION DATE:April 30, 1992

b. TASK: BACKGROUND INORGANIC CONCENTRATIONS RESULTS

Submit a technical report acceptable to the Executive Officer which contains the results of the groundwater inorganics study. The report shall include a comparison of background and affected A-level aquifer conditions to the shallow water discharge effluent concentration limits as indicated in Table 1. Should results of the study show that natural background inorganics concentrations cause the effluent to exceed shallow water effluent limits, the discharger shall provide a technical and cost analysis of increased treatment to reduce mass loading of inorganics.

COMPLETION DATE:October 31, 1992

2. The dischargers shall comply with the Self-Monitoring Program as adopted by the Board and as may be amended by the Executive Officer.
3. The discharger shall also notify the Regional Board if the self-monitoring program results indicate, or if any discharge activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit.
4. This Order includes all items of the attached "Standard Provisions and Reporting Requirements" dated December 1986 except A.10, B.2, B.3, C.8, and C.11.
5. Any noncompliance with a requirement of this Order shall be reported as stated in section C.10 of the "Standard Provisions and Reporting Requirements" referred to in C.4. above.
6. This Order expires February 19, 1992 and the discharger must file a report of Waste Discharge in accordance with Title 23, California Administrative Code, not later than 180 days in advance of such expiration date as application for issuance of new waste discharge requirements.
7. This Order shall serve as a National Pollutant Discharge Elimination System permit pursuant to Section 402 of the Federal Water Pollution Control

Act, or amendments thereto, and shall become effective at the end of ten days from date of hearing provided the Regional Administrator, U. S. Environmental Protection Agency, has no objection.

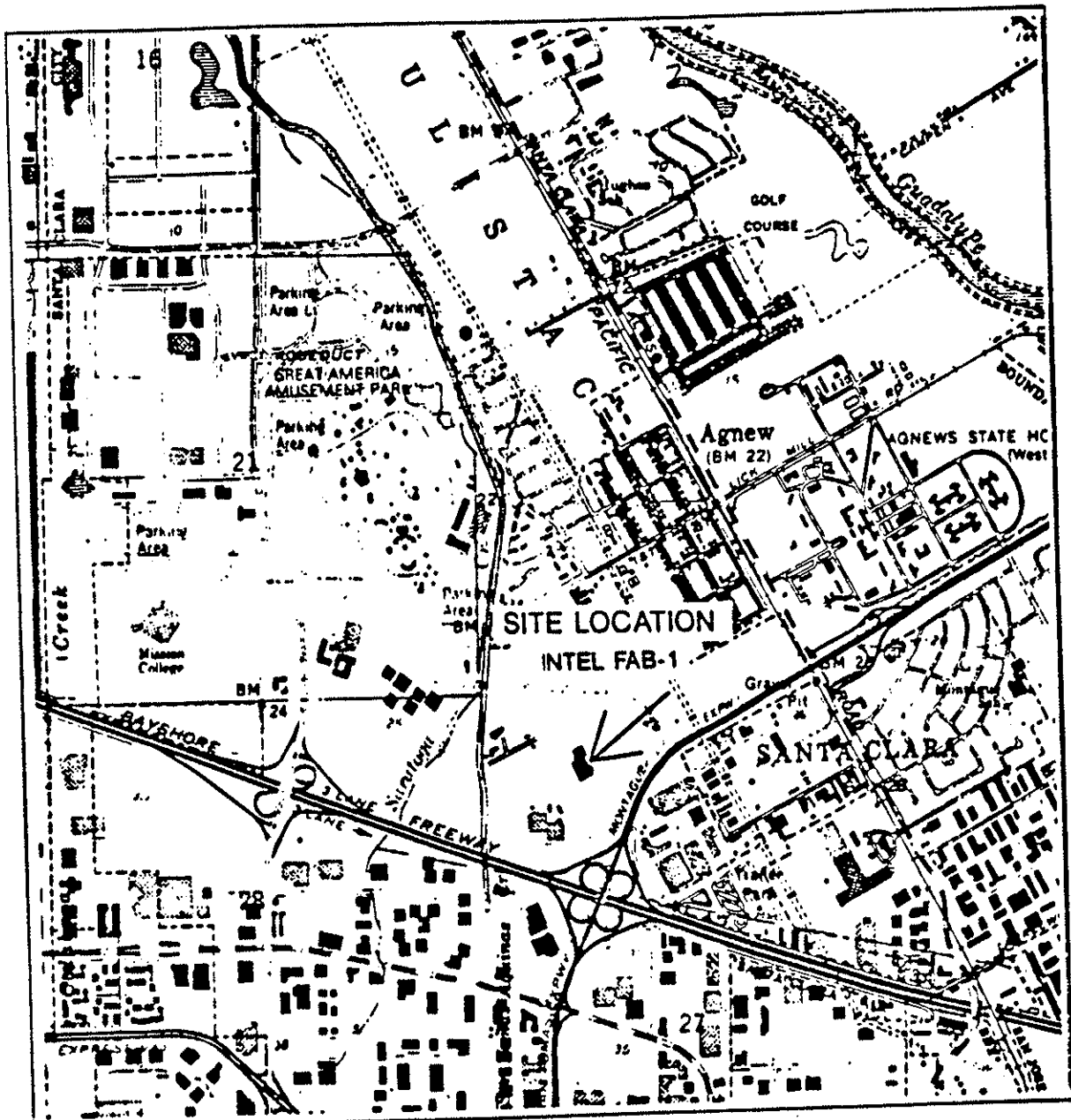
I, Steven R. Ritchie, Executive Officer do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region on February 19, 1992.



STEVEN R. RITCHIE
Executive Officer

Attachments: Groundwater Extraction System
 Site Map

Standard Provisions and Reporting Requirements -
December 1986
Self-Monitoring Program - December 1986



0 1/2 1
Miles



U.S.G.S.
Milpitas, CA
7.5 Minute
Quadrangle

DESIGNED BY RBL	CHECKED BY SAF	PROJECT NO. 403700	FIGURE 1	ENTRIX, INC. LLLL LLLL LLLL WALNUT CREEK CALIFORNIA
DATE 1/11/90	REV DATE 1/29/90	INTEL FAB-1 FACILITY	SITE LOCATION MAP	
FILE NAME SITELOC.DWG		SANTA CLARA, CA		

Intel Fabrication Plant # 1
Outfall 001
NPDES # CA0028649
Application II.A.

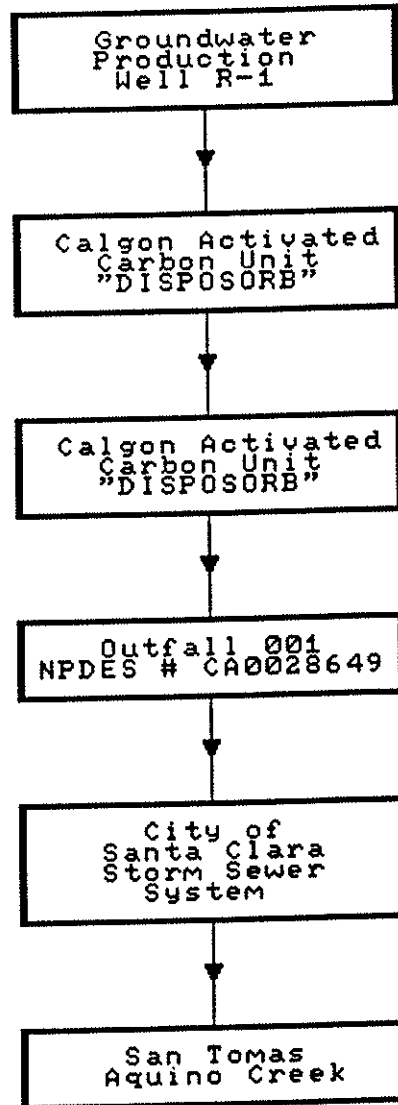


FIGURE 2

Intel Fabrication Plant # 1
Outfall 002
NPDES # CA0028649
Application II.A.

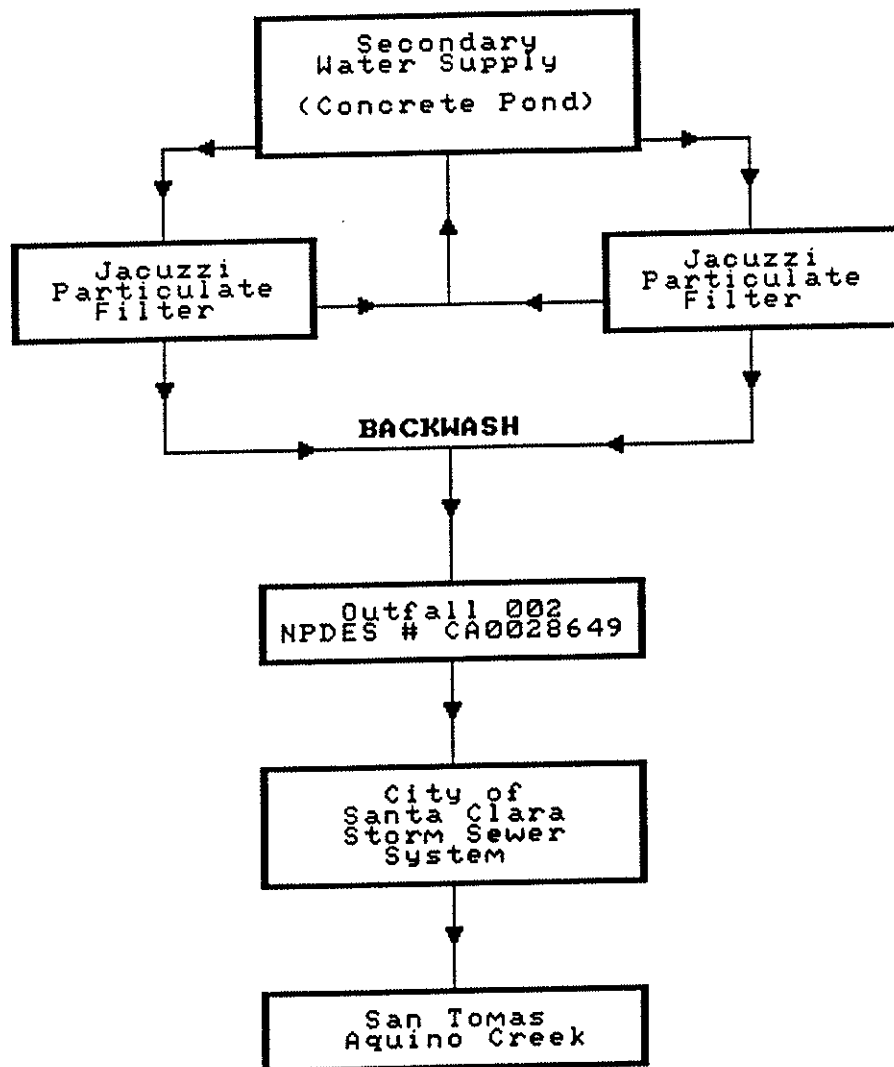


FIGURE 3

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

TENTATIVE

SELF-MONITORING PROGRAM

FOR

INTEL, INC.
3601 JULIETTE LANE
SANTA CLARA, SANTA CLARA COUNTY

NPDES NO. CA0028649

ORDER NO. 92-017

CONSISTING OF

PART A, dated December 1986 and modified January 1987,
 including Appendices A through E

PART B, Adopted: February 19, 1992

PART B

I. DESCRIPTION OF SAMPLING STATIONS

A. INFLUENT

<u>Stations</u>	<u>Description</u>
I-001	At a point in the extraction system immediately prior to inflow to the treatment unit.

B. EFFLUENT

<u>Stations</u>	<u>Description</u>
<u>E-001</u>	At a point in the discharge line immediately following treatment and prior to the effluent reaching the storm drain tributary of San Tomas Aquino Creek.
<u>R-001</u>	At a point in San Tomas Aquino Creek, greater than 100 feet but less than 200 feet from the storm sewer discharge point into the creek.

II. SCHEDULE OF SAMPLING AND ANALYSIS

A. The schedule of sampling and analysis shall be that given in Table A (attached).

III. MISCELLANEOUS REPORTING

If any chemical additives are proposed to be used in the treatment of extracted groundwater, it shall be reported thirty (30) days prior to their use and documented in the regular quarterly reports.

IV. MODIFICATION TO PART A

A. Deletions:

Sections D.1.a., D.2.a., D.2.f., D.2.g., D.2.h., D.3., E.1.e., E.3., E.4. , and F.2.b.

B. Modifications:

1. D.2.a. Samples of effluent shall be collected at times coincident (same day) with influent sampling unless otherwise stipulated. The Regional Board or Executive Officer may approve an alternative sampling plan if it is demonstrated that expected operating conditions warrant a deviation from the standard sampling plan.
2. D.2.d If two consecutive samples of any one constituent or parameter monitored on a weekly or monthly basis in a 30 day period exceed the effluent limit or are otherwise out of compliance, or if the required sampling frequency is once per month or less and the sample or parameter exceeds the limit or is otherwise out of compliance, the discharger shall implement correction procedures acceptable to or approved by the Board or Executive Officer, on a case by case basis.
3. D.2.e. Within twenty-four (24) hours of receiving the analytic results indicating a violation of any instantaneous maximum limit, a confirmation sample shall be taken with analytic results known within twenty-four (24) hours. In the case that the same instantaneous limit is violated in the second sample, the discharge shall be terminated until the cause of the violation is found and corrected. Alternative methods of verifying and correcting violations of instantaneous maximum limits may be substituted with the approval of the Executive Officer.
4. F.2.a. Total flow shall be recorded continuously.
5. G.4. Written reports as required under G.4. shall be submitted twice per year, in July 31 and January 31.
6. G.4.b. The report format shall be in a form acceptable to the Executive Officer of the Regional Board.
7. G.4.e. The report format shall be in a form acceptable to the Executive Officer of the Regional Board. NPDES Discharge Monitoring Report, EPA Form 3320-1, is provided as guidance.

8. G.5. The annual report shall contain all data required for the fourth quarter in addition to summary data required for annual reporting. This report may be submitted in lieu of the report for the fourth quarter of a calendar year.

I, Steven R. Ritchie, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedure set forth in the Regional Board's Resolution No. 73-16 in order to obtain data and document compliance with waste discharge requirements established in Regional Board Order No. 92-017.
2. Was adopted by the Board on February 19, 1992.
3. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the discharger and revisions will be ordered by the Executive Officer or Regional Board.



STEVEN R. RITCHIE
EXECUTIVE OFFICER

Attachment: Table A

TABLE A
SCHEDULE FOR SAMPLING, MEASUREMENTS, AND ANALYSIS

Sampling Station	I-1	E-1		R-1
TYPE OF SAMPLE	G	G		G
Flow Rate (mgd)		Cont		
BOD, 5-day 20°, or COD (mg/l & kg/day)				
Chlorine Residual & Dosage (mg/l & kg/day)				
Settleable Matter (ml/1-hr. & ft ³ /day)				
Total Suspended Matter (mg/l)				
Total Dissolved Solids	Q	Q		Y
Oil and Grease (mg/l & kg/day)				
Bio-assay 96-hr % survival (flow- through or static)		Y		
Ammonia Nitrogen (mg/l & kg/day)		V		
Turbidity (NTU's)				
pH (units)	M	M		Y
Dissolved Oxygen (mg/l and % saturation)				
Temperature (°C)		M		Y
Apparent Color				
Arsenic (µg/l)		2M/Y		
Cadmium (µg/l)		2M/Y		
Chromium, Total (µg/l)		2M/Y		
Copper (µg/l)		2M/Y		
Cyanide (µg/l)		2M/Y		
Lead (µg/l)		2M/Y		
Mercury (µg/l)		2M/Y		
Nickel (µg/l)		2M/Y		
Selenium (µg/l)		2M/Y		
Silver (µg/l)		2M/Y		
Zinc (µg/l)		2M/Y		

Sampling Station	I-1	E-1		R-1
TYPE OF SAMPLE	G	G		G
EPA 601	Q	M		Y
EPA 602				
EPA 624 ¹	Y	Y		
EPA 625 ²	Y	Y		
EPA 8015 (Modified TPH and Diesel)	Q	Q		Y

LEGEND FOR TABLE

TYPES OF SAMPLES

G = grab sample
C-24 = 24 hr. composite
Cont. = continuous sampling
DI = depth integrated sample
BS = bottom sediment sample
O = observation

TYPES OF STATIONS

I = intake or influent stations
E = effluent sampling stations
D = discharge point sampling stations
R = receiving water sample stations
L = basin and/or pond levee stations
B = bottom sediment station
G = groundwater station

FREQUENCY OF SAMPLING

E = each occurrence
H = once each hour
D = once each day
W = once each week
M = once each month

Y = once each year

2/H = twice per hour
2/W = 2 days per week
5/W = 5 days per week
2/M = 2 days per month
2/y = once in March and once in
September
Q = quarterly, once in March, June,
September, and December

2H = every 2 hours
2D = every 2 days
2W = every 2 weeks
3M = every 3 months
Cont = continuous

V = varies; analysis for total
ammonia nitrogen and unionized
ammonia calculated whenever fish
bioassay results fail to meet the
specified percent survival rate

2M/Y = monthly for first 2 months
yearly thereafter

¹ In lieu of 601 analysis and coincident with 625 analysis

² In lieu of 601 analysis and coincident with 624 analysis